WHAT IS CLAIMED IS:

1. A composition of matter comprising between 6 and 14 mass% of a 2-acrylamido-2-methyl-1-propanesulfonic acid (AMPSA)/polyaniline mixture, and between 0.1 and 0.6 mass% of water in dichloroacetic acid (DCAA), such that there are between 30 and 100 molecules of AMPSA per 100 aniline repeat units of the polyaniline.
2. The composition of matter as described in claim 1, wherein the polyaniline has a weight average molecular weight, M_w, between about 90,000 $g \cdot mol^{-1}$ and about 350,000 $g \cdot mol^{-1}$.
3. The composition of matter as described in claim 1, wherein there are approximately 60 molecules of AMPSA per 100 aniline repeat units in the polyaniline.
4. The composition of matter as described in claim 1, wherein the polyaniline contains between about 2 mass% and about 12 mass % of water, whereby said composition of matter contains between 0.1 and 0.6 mass% of water.
5. The composition of matter as described in claim 1, wherein said composition of matter is prepared and stored at temperatures less than about 35 °C.
6. The method for spinning polyaniline fiber as described in claim 1, wherein said polyaniline is halogen-free polyaniline.
7. A method for spinning polyaniline fiber, comprising the steps of:
   (a) adding between 6 and 14 mass% of a mixture of 2-acrylamido-2-methyl-1-propanesulfonic acid (AMPSA) and polyaniline containing between 2 and 12 mass% of water to dichloroacetic acid (DCAA), such that there are between 30 and 100 molecules of AMPSA per 100 aniline repeat units of the polyaniline, forming thereby a composition, wherein during said step of addition the temperature of the composition does not rise above about 35 °C;
   (b) extruding the composition through a spinneret into a coagulant, thereby forming a polyaniline fiber.

8. The method for spinning polyaniline fiber as described in claim 7, wherein the polyaniline has a weight average molecular weight, M_w, between about 90,000 $g \cdot mol^{-1}$ and about 350,000 $g \cdot mol^{-1}$.
9. The method for spinning polyaniline fiber as described in claim 7, wherein there are approximately 60 molecules of AMPSA per 100 aniline repeat units in the polyaniline.
10. The method for spinning polyaniline fiber as described in claim 7, wherein the polyaniline contains between about 2 mass% and about 12 mass % of water, whereby said composition contains between 0.1 and 0.6 mass% of water.
11. The method for spinning polyaniline fiber as described in claim 7, wherein said step of addition the temperature of the composition is 25 ± 5 °C.
12. The method for spinning polyaniline fiber as described in claim 7, wherein said step of extruding the composition into a coagulant comprises immersing the spinneret into the coagulant or by permitting the solution to pass through an air gap before entering the coagulant.
13. The method for spinning polyaniline fiber as described in claim 7, wherein the coagulant is selected from the group consisting of esters, ketones and alcohols and mixtures thereof.
14. The method for spinning polyaniline fiber as described in claim 13, wherein the esters comprise ethyl acetate and butyl acetate.
15. The method for spinning polyaniline fiber as described in claim 7, wherein the coagulant consists of ethyl acetate.
16. The method for spinning polyaniline fiber as described in claim 13, wherein the ketones comprise acetone, methylisobutyl ketone, and 2-butanone.
17. The method for spinning polyaniline fiber as described in claim 13, wherein the alcohols comprise methanol, ethanol, and isopropyl alcohol.
18. The method for spinning polyaniline fiber as described in claim 7, further comprising the step of heating the polyaniline fiber to between about 50 and about 100 °C after said step of extruding the composition into a coagulant.
19. The method for spinning polyaniline fiber as described in claim 18, wherein the polyaniline fiber is heated to between about 70 and about 90 °C.

20. The method for spinning polyaniline fiber as described in claim 18, further comprising the step of stretching the heated polyaniline fiber up to about 3x its unstretched length.

21. The method for spinning polyaniline fiber as described in claim 20, wherein the heated polyaniline fiber is stretched to between about 1.2 and about 2.5 times its unstretched length.

22. The method for spinning polyaniline fiber as described in claim 20, wherein said step of stretching the heated polyaniline fiber comprises stretching the heated polyaniline fiber between two pairs of godet cylinders, the polyaniline fiber passing around a first pair of godet cylinders before passing around the second pair of godet cylinders.

23. The method for spinning polyaniline fiber as described in claim 22, wherein said step of heating the polyaniline fiber occurs after the polyaniline fiber exits the first pair of godet cylinders, and before the fiber enters the second pair of godet cylinders.

24. The method for spinning polyaniline fiber as described in claim 7, further comprising the step of exchanging the AMPSA with a selected dopant molecule after said step of extruding the composition into a coagulant.

25. The method for spinning polyaniline fiber as described in claim 24, wherein said step of exchanging the AMSPA with a selected dopant molecule comprises passing the polyaniline fiber through a solution containing the selected dopant molecule.

26. The method for spinning polyaniline fiber as described in claim 25, wherein the solution comprises an aqueous solution of phosphoric acid.

27. The method for spinning polyaniline fiber as described in claim 7, further comprising the step of dedoping the polyaniline fiber after said step of extruding the composition into a coagulant.

28. The method for spinning polyaniline fiber as described in claim 27, wherein said step of dedoping the polyaniline fiber is achieved by a method selected from the group consisting of passing the polyaniline fiber through a solution

which substantially removes the AMPSA from the polyaniline fiber, exposing the polyaniline fiber to steam, and passing the polyaniline through water.

29. The method for spinning polyaniline fiber as described in claim 28, wherein the solution which substantially removes the AMSPA from the polyaniline fiber comprises an aqueous alkali solution.

30. The method for spinning polyaniline fiber as described in claim 29, wherein the aqueous alkali solution comprises ammonium hydroxide.

31. The method for spinning polyaniline fiber as described in claim 27, further comprising the step of redoping the polyaniline fiber with a selected dopant molecule after said step of dedoping the polyaniline fiber.

32. The method for spinning polyaniline fiber as described in claim 31, wherein said step of redoping the polyaniline fiber comprises passing the polyaniline fiber through a solution containing the selected dopant molecules.

33. The method for spinning polyaniline fiber as described in claim 32, wherein the solution containing the selected dopant molecule comprises aqueous solutions of the acids selected from the group consisting of phosphoric acid, triflic acid, hydrochloric acid, methanesulfonic acid, oxalic acid, pyruvic acid, and acrylic acid.

34. The method for spinning polyaniline fiber as described in claim 33, wherein the selected dopant is phosphoric acid in an amount effective for rendering the polyaniline fiber flame retardant.

35. The method for spinning polyaniline fiber as described in claim 7, further comprising the step of removing the DCAA from the polyaniline fiber after said step of extruding the composition into a coagulant.

36. The method for spinning polyaniline fiber as described in claim 7, further comprising the step of collecting the polyaniline fiber.

37. The method for spinning polyaniline fiber as described in claim 7, wherein said polyaniline is halogen-free polyaniline.

38. The method for spinning polyaniline fiber as described in claim 7, further comprising the step of forming the polyaniline fiber into a yarn.

39. A method for exchanging dopant molecules in electrically conductive fiber spun from a solution comprising polyaniline, 2-acrylamido-2-methyl-1-propanesulfonic acid and dichloroacetic acid with a selected dopant molecule, which comprises the steps of extruding the spin solution into a coagulant, thereby causing the spin solution to coagulate and form a fiber, and immersing the resulting polyaniline fiber in a solution containing the dopant molecule for a time effective to achieve dopant exchange.

40. The method for exchanging dopant molecules in electrically conductive fiber as described in claim 39, wherein the coagulant is selected from the group consisting of esters, ketones and alcohols, and mixtures thereof.

41. The method for exchanging dopant molecules in electrically conductive fiber as described in claim 40, wherein the esters comprise ethyl acetate and butyl acetate.

42. The method for exchanging dopant molecules in electrically conductive fiber as described in claim 40, wherein the ketones comprise acetone, methylisobutyl ketone, and 2-butanone.

43. The method for exchanging dopant molecules in electrically conductive fiber as described in claim 40, wherein the alcohols comprise methanol, ethanol and isopropyl alcohol.

44. The method for exchanging dopant molecules in electrically conductive fiber as described in claim 39, wherein the solution comprises an aqueous solution of phosphoric acid.

45. A method for removing dopant molecules from electrically conductive fiber spun from a solution comprising polyaniline, 2-acrylamido-2-methyl-1-propanesulfonic acid and dichloroacetic acid, which comprises the steps of extruding the spin solution into a coagulant, thereby causing the spin solution to coagulate and form a polyaniline fiber, and immersing the resulting polyaniline fiber in a solution effective for removing the dopant molecules for a time sufficient to achieve a chosen level of dopant molecule removal.

46. The method for removing dopant molecules from electrically conductive fiber as described in claim 45, wherein the coagulant is selected from the group consisting of esters, ketones and alcohols, and mixtures thereof.

47. The method for removing dopant molecules from electrically conductive fiber as described in claim 46, wherein the esters comprise ethyl acetate and butyl acetate.

48. The method for removing dopant molecules from electrically conductive fiber as described in claim 46, wherein the ketones comprise acetone, methylisobutyl ketone, and 2-butanone.

49. The method for removing dopant molecules from electrically conductive fiber as described in claim 46, wherein the alcohols comprise methanol, ethanol and isopropyl alcohol.

50. The method for removing dopant molecules from electrically conductive fiber as described in claim 45, wherein the solution comprises an aqueous alkali solution.

51. The method for removing dopant molecules from electrically conductive fiber as described in claim 50, wherein the aqueous alkali solution comprises ammonium hydroxide.

52. The method for removing dopant molecules from electrically conductive fiber as described in claim 45, further comprising the step of removing the DCAA from the polyaniline fiber.

53. A method for redoping electrically conductive fiber spun from a solution comprising polyaniline, 2-acrylamido-2-methyl-1-propanesulfonic acid and dichloroacetic acid with a selected dopant molecule, which comprises the steps of extruding the spin solution into a coagulant, thereby causing the spin solution to coagulate and form a polyaniline fiber, immersing the resulting fiber in a solution effective for removing the dopant molecules for a time sufficient to achieve a chosen level of dopant molecule removal, and immersing the dedoped polyaniline fiber in a solution containing the selected dopant molecules for a time effective for achieving a chosen level of selected dopant molecules in the polyaniline fiber.

54. The method for redoping electrically conductive fiber as described in claim 53, wherein the coagulant is selected from the group consisting of esters, ketones and alcohols, and mixtures thereof.

55. The method for redoping electrically conductive fiber as described in claim 54, wherein the esters comprise ethyl acetate and butyl acetate.

56. The method for redoping electrically conductive fiber as described in claim 54, wherein the ketones comprise acetone, methylisobutyl ketone, and 2-butanone.

57. The method for redoping electrically conductive fiber as described in claim 54, wherein the alcohols comprise methanol, and isopropyl alcohol.

58. The method for redoping electrically conductive fiber as described in claim 53, wherein the solution effective for removing the dopant comprises an aqueous alkali solution.

59. The method for redoping electrically conductive fiber as described in claim 58, wherein the aqueous alkali solution comprises ammonium hydroxide.

60. The method for redoping electrically conductive fiber as described in claim 53, wherein the solution containing the selected dopant molecule comprises aqueous solutions of the acids selected from the group consisting of triflic acid, hydrochloric acid, methanesulfonic acid, oxalic acid, pyruvic acid, and acrylic acid.

61. The method for redoping electrically conductive fiber as described in claim 53, further comprising the step of removing the DCAA from the polyaniline fiber.